

Claims

1. A customizing kit (1) for a vehicle air suspension system, comprising an additional air spring volume (2) with a connecting line (6) which can be connected to a vehicle main air spring volume (4) and with a switching device (8) for selective connection or disconnection of the additional air spring volume (2), with the switching device (8) being arranged in the area of the connecting line (6) and being designed such that, on the one hand, when it is in an open position, it releases the cross section of the connecting line (6) virtually completely for flow to pass through in both directions and, on the other hand, when it is in a closed position, reduces the cross section to a specific residual opening cross section, such that this results in effective closure of the connecting line (6) by use of the so-called Helmholtz effect in a specific region (which can be expected in practice) of an excitation frequency of the oscillating air volume.

2. The customizing kit as claimed in claim 1, wherein the switching device (8) is formed by a restrictor valve (14), which is in the form of a disk, is arranged in the connecting line (6) and is mounted such that it can rotate about a shaft (16) running transversely with respect to the connecting line (6) such that its disk surface is aligned in the longitudinal direction of the connecting line (6) in the open position, and is aligned in the transverse direction in the closed position, with the residual opening cross section in the closed position being formed by a circumferential gap (18) which surrounds the restrictor valve (14).

3. The customizing kit as claimed in claim 2, wherein the restrictor valve (14) can be operated mechanically, without any connection and without any

contact, by means of at least one magnetic field (A; B) from a magnet arrangement (20) which is arranged outside the connecting line (6).

5 4. The customizing kit as claimed in claim 2 or 3,
wherein the restrictor valve (14) is mounted via
opposite shaft ends (36) within the connecting line
(6), in particular in bearing openings (38) in a
retaining bush (40) which is inserted into the
10 connecting line (6).

5. The customizing kit as claimed in claim 4,
wherein the retaining bush (40) is subdivided into two
parts (40a, 40b) in a radial or axial plane which
15 preferably runs through the bearing openings (38), such
that the two parts (40a, 40b) can be joined together,
holding the shaft ends (36) of the restrictor valve (14).

6. The customizing kit as claimed in one of claims 3
20 to 5,
wherein the restrictor valve (14) is magnetized such
that it can be aligned in a corresponding manner to the
magnetic field (A; B) from the external magnet
arrangement (20).

25 7. The customizing kit as claimed in claim 6,
wherein the restrictor valve (14) has a correspondingly
magnetized magnet element (22), in particular a ring
magnet.

30 8. The customizing kit as claimed in claim 6,
wherein the restrictor valve (14) is composed of an
appropriately magnetized material, in particular of a
plastic-bonded permanent magnet.

35 9. The customizing kit as claimed in one of claims 3
to 8,

wherein the external magnet arrangement (20) has at least one magnet element (24, 26) which is electromagnetically in the form of a solenoid coil (28; 28a,b) which can be controlled electrically and/or can be
5 moved physically, or is in the form of a permanent magnet (30) which can be moved physically.

10. The customizing kit as claimed in one of claims 3 to 9,
10 wherein the restrictor valve (14) has a rest position which is governed by spring force (F) and has a mechanical end stop (29), from which it can be moved to an operating position by means of the magnetic field (A and/or B) from the external magnet arrangement (20).

15 11. The customizing kit as claimed in one of claims 3 to 9,
wherein the restrictor valve (14) can rotate freely about the shaft (16), with the magnet arrangement (20)
20 having two magnet elements (24, 26) such that the restrictor valve (14) can be aligned in the closed position by the magnetic field (A) of the first magnet element (24) and can be aligned in the open position by the magnetic field (B) of the other magnet element (26).

25 12. The customizing kit as claimed in claim 11,
wherein the restrictor valve (14) can be aligned in any desired intermediate position by superimposition of the magnetic fields (A, B) of the two magnet elements (24,
30 26).

13. The customizing kit as claimed in one of claims 2 to 12,
wherein the restrictor valve (14) is asymmetrically
35 subdivided into two valve sections by the shaft (16), such that, when it is in the open position, fluttering movements caused by the flow are avoided.

14. A switching device (8) for a customizing kit (1) as claimed in one of the preceding claims, having a restrictor valve (14) which can be arranged in the connecting line (6) and is mounted such that it can rotate between an open position and a closed position, with a specific residual opening cross section remaining in the closed position.

15. The switching device as claimed in claim 14, distinguished by a magnet arrangement (20), which can be arranged outside the connecting line (6) in the vicinity of the restrictor valve (14), in order to mechanically operate the restrictor valve (14) without any connection and without any contact, with the restrictor valve (14) being magnetized with two or more poles.

16. The switching device as claimed in claim 15, wherein the magnet arrangement (20) has at least two magnet elements (24, 26) for producing superimposed magnetic fields (A, B) for the purpose of alignment of the restrictor valve (14) on the basis of an overall magnetic field (A+B) which results from this.

17. The switching device as claimed in claim 16, wherein a first magnet element (24) produces a magnetic field (A) which runs transversely within the connecting line (6) and a second magnet element (26) produces a magnetic field (B) which runs longitudinally within the connecting line (6).

18. The switching device as claimed in claim 16, wherein at least two magnet elements (24a, 26a) are provided in order to produce magnetic fields (A+B) which run parallel but have opposite polarity.

19. The switching device as claimed in one of claims 15 to 18,

wherein the magnet arrangement (20) has at least one solenoid coil (28, 28a,b) which can be driven electrically and/or can be moved mechanically, and/or has at least one permanent magnet (30) which can be
5 moved mechanically.